Instruction using the Picture Exchange Communication Systems (PECS) appears to enhance generalization of communication skills among children with autism in comparison to Responsive Education and Prelinguistic Milieu Teaching (RPMT)[1]

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QUESTION

Which of two methods of training communication skills, PECS or RPMT, produces greater generalization of the use of graphic symbols to communicate in children with ASD?

METHODS

Design

A randomized control trial was used to compare two treatment conditions: (a) PECS or (b) Responsive Education and Prelinguistic Milieu Teaching (RPMT) (Yoder & Stone, 2006; for a commentary on this study please see Goldstein, 2007). All children had access to graphic symbols to exchange with the examiner during a pre- and post-treatment assessment using an adapted version of the Early Social Communication Scales-Abridged (ESCS-Abridged; Mundy Sigman, & Kasari, 1996). Groups were reported to be equivalent in terms of attendance to non-project treatments, number of treatment sessions, and rate of PECS use at Time 1.

Allocation

The participants from this study were drawn from a prior study examining effects of two social-communication interventions (i.e., PECS and RPMT) in young children with ASD (Yoder & Stone, 2006). In that study, preschoolers with ASD were randomly assigned to one of the two treatment conditions; 19 children were assigned to the PECS intervention, and 17 children were assigned to the RPMT intervention.

Blinding

Assessments were completed by examiners who were not involved in the treatment and who were blind to group assignment. Coders were kept blind by having graphic symbols available to all children during the pre- and post-treatment measures.

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Study duration

The time between the initial pre-treatment assessment (Time 1), and the post-treatment assessment (Time 2) was 6 months.

Setting

The study was conducted in a university clinic setting.

Participants

Thirty-six preschool children with ASD participated. Inclusion criteria were that (a) children were between the ages of 18 and 60 months, (b) used fewer than 10 words during communication samples, and (c) passed a hearing screening. Upon entry into the study, 33 children had a diagnosis of autism and 3 had a diagnosis of pervasive developmental disorder.

Intervention

All participants received three individual 20-min treatment sessions per week for 6 months; and both conditions included a parent component. In the PECS treatment, interventionists trained on the PECS curriculum (Bondy & Frost, 1994) taught the participants to exchange graphic symbols for objects; with movement through the six PECS phases. The parent PECS component consisted of demonstration and discussion of how to use PECS outside of treatment sessions, and provision of PECS materials to use at home and in the community. In the RPMT treatment, therapists targeted specific prelinguistic communication behaviors (e.g., gestures, vocalizations, and eye gaze) within highly engaging play routines. They used least intrusive communication prompts to elicit requests for actions or objects. Parents were encouraged to use responsive play and communication strategies, to help their children stay engaged in productive play and to enhance language development. Fidelity of treatment data was reported in Yoder and Stone (2006) and was based on rating specific components of the two interventions on a 3-point scale (ranging from 'poor' to 'excellent') once per month for individual treatment sessions.

Outcomes

At the start of the study (Time 1), an adapted version of the Early Social Communication Scales-Abridged (ESCS-Abridged; Mundy et al., 1996) was administered to all children. This test was then administered post-treatment (Time 2) as the measure of generality (i.e., far-transfer) of PECS use across several different dimensions – that is, the examiner, setting, activities, and materials differed from those in the treatment sessions for both RPMT and PECS. The adaptation to the ESCS included using a single symbol on a communication book for each test item administered. Symbols were replaced whenever a new test item was introduced by the examiner or if requested by the child. Thus, children did not have to discriminate between symbols before making an exchange. Interobserver agreement was calculated for 20% of the monthly sessions; with a reported agreement of 90% for the PECS condition and 99% for the RPMT. No inter-rater agreement for the dependent measure (i.e., generalized PECS use) was reported.

Attrition

All participants who were originally enrolled completed the study.

MAIN RESULTS

Group differences in picture exchanges during the Time 1 administration of the ESCS-Abridged test were not significant; only 1 child in each treatment group used 1 PECS

exchange. At Time 2, post-treatment, there were significant between group differences in the number of symbols exchanged during the ESCS assessment; with the PECS treatment group exchanging an average of 3.84 (SD = 4.5) and the RPMT exchanging an average of 1.06 (SD = 1.3) symbols. The treatment effect size was large (t = 2.56; p = .018, d = .81).

AUTHOR'S CONCLUSIONS

From the results, the authors concluded that compared to an alternative social-communication intervention; children taught to use PECS over a period of 6 months will use more graphic symbols to communicate with an adult in an untrained or generalized assessment setting. That is, the young children who received the PECS treatment continued to use PECS with a different adult, with new materials, and in a novel setting more often than young children who participated in RPMT treatment. These outcomes support the authors position that PECS can be a useful, effective treatment strategy to enhance children's coordinated joint attention between an object and a person to communicate, without requiring eye contact.

Commentary

The participants for this study were selected from a prior, randomized control trial examining the effects of two prelinguistic treatments for preschool children with ASD (Yoder & Stone, 2006). In this previous study, PECS was found to be an effective intervention in increasing requests more than the RPMT treatment specifically for children with minimal ability to initiate joint attention. Given the strong internal validity and large treatment effect sizes of this prior study, the outcomes of the current study are noteworthy. For this commentary, the same intervention from Yoder and Stone was analyzed for another dependent measure, that is, participant use of graphic symbols in a generalized assessment setting. The authors innovatively adapted an early social communication assessment by providing access to Mayer Johnson picture symbols representative of different test items. They created a controlled pre- and post-assessment context as a measure of generalized picture symbol use, with degree of familiarity of this measurement context equal across the two treatment groups. The groups were also considered equal on seven pre-treatment child and session variables; and further analysis of two variables that did differ between the groups, that is the ADOS social score (Lord, Rutter, DiLavore, & Risi, 1999) and the Mullen Expressive Language subscale (Mullen, 1995) were not correlated with the dependent variable (number of pictures exchanged at post-treatment assessment). At Time 2, treatment effect sizes were large; children who received the 6 month PECS training exchanged a significantly greater number of graphic symbols with an adult in the generalized assessment context than the children who participated in the RPMT treatment.

In this study, the children did not have to discriminate among symbols due to the fact that only one symbol was available to select for each test item. The authors acknowledged this limitation, and explained that an exchange of a symbol could only be interpreted as a communicative signal to the examiner; not as an understanding of a 1:1 correspondence of symbol and concept (Cress, 2006). That is, it cannot be construed from the results of this study that the children exchanged the symbol based on a *representational* knowledge or use of the symbols; only that they understood that the symbols could make something happen, for example, to get them something they wanted.

There are a number of important conclusions that can be drawn from the study outcomes. First, results provide valid support to the idea that children with ASD can learn to exchange graphic symbols in a novel assessment context following a period of PECS training in a clinic setting. Second, a picture exchange system may provide young children between the ages of 18 and 60 months who are at a preintentional communication level with a way to

begin to initiate and engage in coordinated joint attention with a communication partner. Children with autism demonstrate deficits in the ability to respond to or initiate joint attention; and this nonverbal skill is related to later gains in social competencies and language skills (Mundy et al., 1990; Sigman & Ruskin, 1999). Specific strategies that early interventionists and clinicians can implement to facilitate joint attention and engagement are needed (Kaiser, Hester, & McDuffie, 2001). PECS is readily available and commonly used in many preschool classrooms serving young children with autism; this study provided evidence that PECS can also be successfully taught within a clinic setting. The children in each treatment condition did not vary on the majority of pretreatment characteristics (e.g., language, cognitive, and social-communication skills) the authors thought could affect their rate of symbols exchanged during the post-treatment ESCS assessment. These similarities between the two groups, and the relatively large number of participants, lend support for extending the outcomes to similar groups of children who attend clinical treatment sessions. It would be interesting to measure generalized PECS use in a far-transfer test within a school or classroom setting following implementation throughout the day as described in the PECS training manual. Given that this is typically where children learn this communication system, they may demonstrate greater gains in a shorter time period.

Acknowledgments

References

Bondy, A.; Frost, L. PECS: The Picture Exchange Communication System training manual. Pyramid Educational Consultants; Cherry Hill, NJ: 1994.

Cress, C. Strategies for incorporating formal AAC into children's earliest communication interactions. FL; Miami Beach: 2006. American Speech and Hearing Association Annual Conference

Goldstein H. PECS and responsive prelinguistic milieu teaching in children with autism produce similar gains in requesting. Evidence-Based Communication Assessment and Intervention. 2007; 1:121–123. [Abstract].

Abstract of Yoder P, Stone WL. Randomized comparison of two communication interventions for preschoolers with autism spectrum disorders. Journal of Consulting and Clinical Psychology. 2006; 74:426–435. [PubMed: 16822100]

Lord, C.; Rutter, M.; DiLavore, P.; Risi, S. Autism Diagnostic Observation Schedule (ADOS). Western Psychological Services; Los Angeles: 1999.

Mullen, E. Mullen scales of early learning: AGS edition. AGS; Circle Pines, MN: 1995.

Mundy, P.; Hogan, A.; Doehring, P. A preliminary manual for the abridged early social communication scales (ESCS). University of Miami; Coral Gables, FL: 1996.

Mundy P, Sigman M, Kasari C. A longitudinal study of joint attention and language development in autistic children. Journal of Autism and Developmental Disorders. 1990; 20:115–123. [PubMed: 2324051]

Sigman M, Ruskin E. Continuity and change in the social competence of children with autism, Down syndrome, and developmental delays. Monographs for the Society for Research in Child Development. 1999; 64(1):1–139.

Yoder P, Stone WL. Randomized comparison of two communication interventions for preschoolers with autism spectrum disorders. Journal of Consulting and Clinical Psychology. 2006; 74:426–435. [PubMed: 16822100]